



**ST. CLARE COLLEGE**  
**GIRLS' SECONDARY SCHOOL - PEMBROKE**  
**HALF-YEARLY EXAMINATION FEBRUARY 2012**

**FORM 3**

**PHYSICS**

**TIME: 1 h 30 min**

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Total Mark:

**ANSWERS MUST BE WRITTEN IN INK. EXCEPT WHERE THEY ARE EXPRESSLY REQUIRED, PENCILS MAY BE USED ONLY FOR DRAWING, SKETCHING, OR GRAPHICAL WORK.**

*Answer all questions in the spaces provided on the Examination Paper. All working must be shown. The use of a calculator is allowed. The following formulae may be useful:*

**Work = force x distance  
from pivot**

**Moment = force x perpendicular distance**

**Power =  $\frac{\text{work done}}{\text{time taken}}$**

**Pressure =  $\frac{\text{force}}{\text{area}}$**

**K.E. =  $\frac{1}{2}mv^2$**

**Density = mass/Volume**

**P.E. = mgh**

**W = mg**

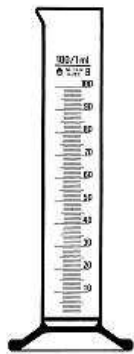
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Question	1	2	3	4	5	6	7	8	Total Exam	Practical	Final Mark
Marks											

**Section A. Answer ALL QUESTIONS. This Section carries 40 marks.**

1. This question is about Measurements.

a



This instrument is called a \_\_\_\_\_. It is used to measure the \_\_\_\_\_ of water. You should always read this at eye-level to avoid \_\_\_\_\_ error

3

b



This instrument is called a \_\_\_\_\_ balance. It measures the \_\_\_\_\_ of an object. The S.I unit of this instrument is \_\_\_\_\_.

3

c Time is measured using a \_\_\_\_\_ watch. The S.I unit of time is the \_\_\_\_\_.

2

2. This question is about Mass and Weight

a John wants to find the weight of his school bag. What instrument should he use?

\_\_\_\_\_ 1

b He finds that the weight of his bag is 100N. What is the mass of the bag?

\_\_\_\_\_  
\_\_\_\_\_ 2

c State if these statements are True or False

Statements	True	False
• Mass is a force		
• The S.I unit of mass is N		
• Weight is the pull of gravity on an object		
• An object in outer space is weightless		
• Mass is different on the Earth and on the Moon		

1  
1  
1  
1  
1

3. This question is about Vectors and Scalars

a What is a Vector quantity

\_\_\_\_\_

1

b State whether the following quantities are vectors or scalars by rewriting them under their appropriate column.

[ Force, Time, length, Moment]

Scalars	Vectors

4

4. This question is about Moments

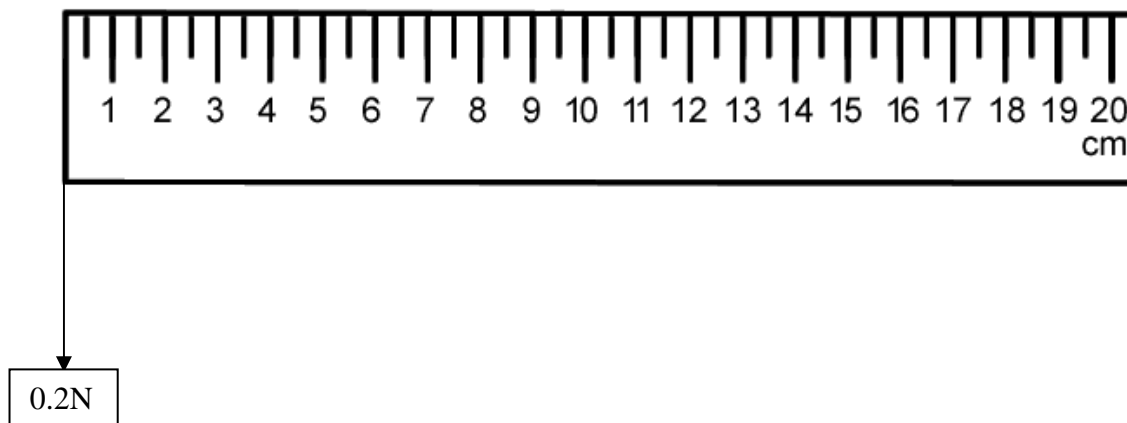
Pat decides to place a weight of 0.2N at one end of a **uniform ruler** 20cm long. A pivot is placed on the 6cm mark.

a On the diagram below mark the pivot with a triangular shape.

1

b Also on the diagram below mark the weight of the ruler with an arrow and label it **W**.

1



c. Calculate the size of the moment of the 0.2N weight about the pivot.

\_\_\_\_\_  
\_\_\_\_\_

3

d. What is the clockwise moment produced by the weight on the pivot?

\_\_\_\_\_

1

e. Calculate the weight of the ruler?

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2

f. The principle of moments states that \_\_\_\_\_

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2

5 This question is about Work and Power



The man is working on top of a roof 10m high. He has to lift a bucket which has a mass of 6kg.

a. What is the weight of the bucket?

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1

b. If the man has to pull up the bucket, how much work done must he do?

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2

c. If he takes 5seconds to pull the bucket up how much power does he develop?

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2

d. What happens to the power if the time taken to pull up the bucket is doubled?

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2

e. If the man drops the bucket, the Potential Energy at the top is changed to Kinetic Energy at the bottom. This is known as the Principle of Conservation of Energy. State this Principle?

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2

**Section B. Answer ALL Questions. This Section carries 45 marks.**

1. This question is about forces and springs.

While working in their garage, Emily and her father found two different steel springs. With the help of her father, Emily decided to test one of the springs for its elasticity.

She managed to obtain the following results and she put them in the table shown below.



Force/N	0	5	10	15	20	25	30	35
Extension (cm)	0	4	8	12	16	21	24	28

a State Hooke's Law.

\_\_\_\_\_

\_\_\_\_\_

2

b Plot a graph of force (N) on the y-axis against extension (cm) on the x-axis

5

c One of the extension readings in the above table was wrongly calculated.

i. Encircle the wrong reading on the table.

1

ii. The reading should be \_\_\_\_\_

1

iii. How did Emily calculate the extension?

\_\_\_\_\_

\_\_\_\_\_

2

d Use your graph to find the force needed to produce an extension 14cm  
\_\_\_\_\_N

1

e i She repeated the experiment with the **other** spring and she plotted a graph on the same graph paper. If the other spring was less stiff (easier to stretch) how would its graph compare to the graph that you drew?

\_\_\_\_\_

1

ii By mistake Emily overloaded this spring. What noticeable difference will there be in the appearance:

- of the graph

\_\_\_\_\_

1

- of the spring after the weights have been removed.

\_\_\_\_\_

1

2. This question is about density

Julia has a salt water fish aquarium. She wants to find the density of the salt water in her aquarium to ensure that her fish grow in the best ambient conditions.



a Write an account of what Julia must do to find the density of salt water in her aquarium.

i Your account must include :

Labelled diagrams of how to find the mass and volume:

4

ii the method

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5

iii the equation used

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1

- iv If the amount of salt water in the aquarium is reduced so the girl can clean the tank, will the density of salt water change? Explain.

\_\_\_\_\_ 2  
\_\_\_\_\_

- b A glass bottle contains  $75\text{cm}^3$  of olive oil. If the empty bottle has a mass of 50g and 120g when full with oil, find the density of olive oil.

\_\_\_\_\_ 3  
\_\_\_\_\_

3. This question is about energy.

- a Energy sources can be divided into two.

- i Complete the sentences:

Renewable sources

\_\_\_\_\_ 1

- ii Non-renewable sources

\_\_\_\_\_ 1

- b Fill in the table below by writing two types of each source (Other than that mentioned in question c).

Renewable sources	Non-renewable

4

- c Give one advantage and one disadvantage of using Wind energy

Wind

Advantage: \_\_\_\_\_ 1

Disadvantage: \_\_\_\_\_ 1

- d A lump of plasticene of mass 50g is thrown up in the air and reaches a height of 10m.
- i Calculate the energy it has when it reaches maximum height.
- \_\_\_\_\_
- \_\_\_\_\_ 2
- ii The plasticene starts falling down and sticks to the ground.  
What type of energy does it have just before touching the ground?
- \_\_\_\_\_ 1
- iii How much is this energy just before touching the ground?
- \_\_\_\_\_ 1
- iv. Calculate the velocity of plasticene just before touching the ground.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_ 2
- v. What happens to this energy?
- \_\_\_\_\_ 1